ABSTRACT OF THE DISCLOSURE

The present invention is directed in one aspect to methods of making free-standing, internally-supported, three-dimensional objects having an outer surface comprising a plurality of intersecting facets wherein a sub-set of the intersecting facets have a diamond layer of substantially uniform thickness. The diamond layer may be formed by chemical vapor deposition (CVD) over the surface of a substrate that has been fabricated to form a mold defining the sub-set of intersecting facets. A backing layer may be formed over at least a portion of the exposed diamond layer to enhance the rigidity of the layer when the substrate is removed.